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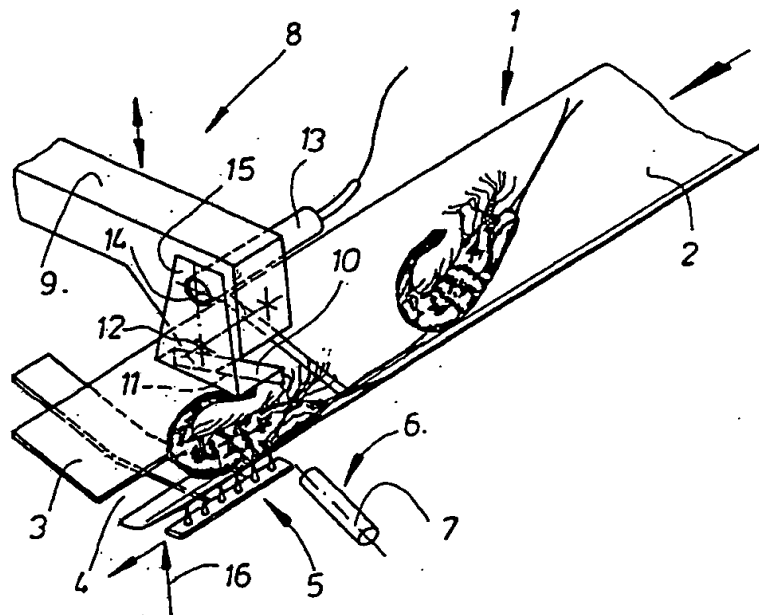
A2U

Selected US specifications from IPC sub-class A22C

## (54) Transport and checking apparatus for prawns

(57) Transport and conveying apparatus for prawns comprises conveying equipment (1) for prawns and a feeler device (8) with a feeler element (10) which is pivotably mounted to rotate about an axis (12) parallel to the path of the prawns and which is cyclically lowered onto the prawns before conveying on for processing. That part of the feeler element (10) which comes into contact with each prawn is in the form of a feeler edge (11), which extends transversely to the conveying direction of the prawns. As illustrated the edge (11) is set obliquely to the path of the prawns, and the feeler element (10) retains its orientation relative to its support arm (9) when the edge (11) contacts a correctly oriented prawn, but is caused to tilt about axis (12) when the edge (11) is brought to rest against an incorrectly oriented prawn or a foreign body, thereby moving a switching tag (15) past a sensor (13) which initiates rejection of the body by air from nozzle (7) of ejector (6).

Fig. 1



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Fig. 1

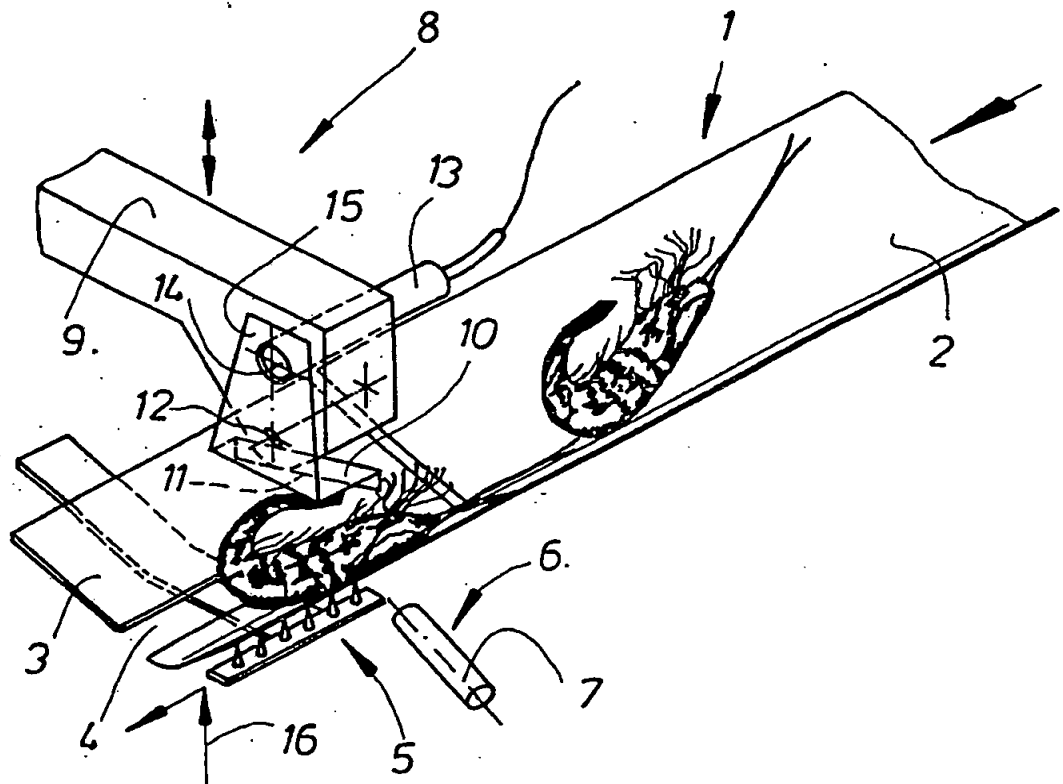


Fig. 2a<sup>2/2</sup>

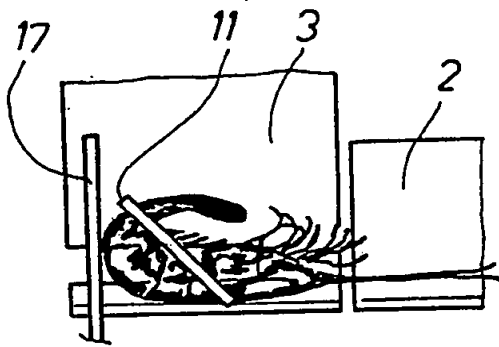


Fig. 2

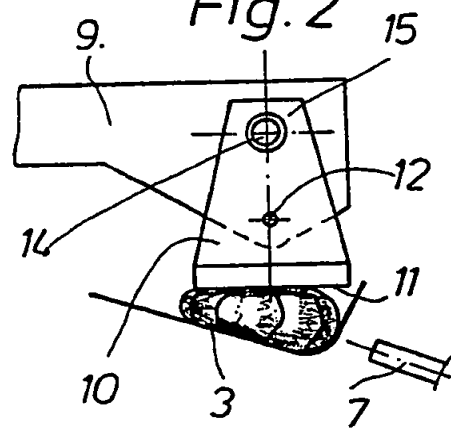


Fig. 3a

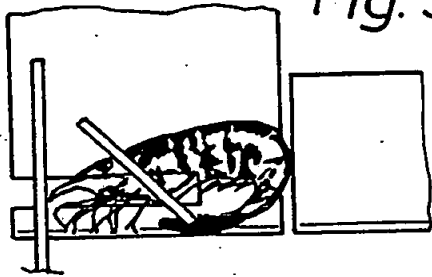


Fig. 3

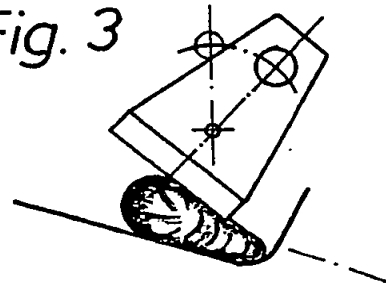


Fig. 4a

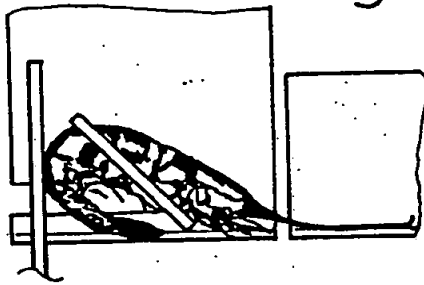


Fig. 4

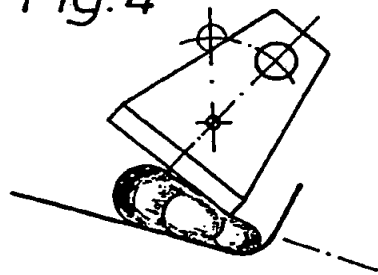


Fig. 5a

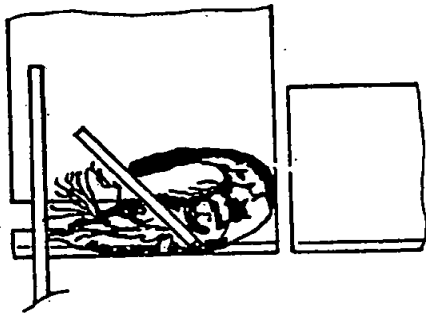
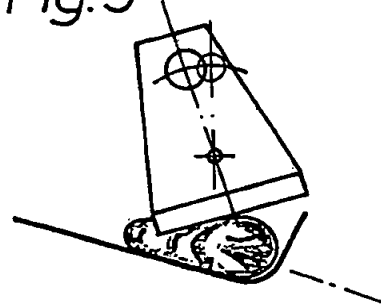


Fig. 5



## SPECIFICATION

## Transport and checking apparatus for prawns

5 The present invention relates to transport and checking apparatus for prawns (which term in this specification includes shrimps), especially apparatus which is employable in a machine  
 10 for the removal of the exoskeleton of scalded prawns and which serves for the monitoring of the prawns in respect of the presence of foreign matter, fragments of prawns and damaged prawns as well as for the recognition of  
 15 prawns incorrectly oriented, so as to avoid interruption of the shelling process.  
 In DE-PS 34 23 236 there is disclosed equipment with the task of recognising foreign bodies which endanger the sensitive shelling  
 20 tools, such as stones, mussels and so forth, as well as incorrectly oriented or damaged prawns disturbing the continuity of the shelling process and fragments of the same, so that an elimination of these disturbing factors can  
 25 take place in good time.  
 In practice, however, this task has not been solved satisfactorily in respect of certainty of the recognition. The cause for this, where errors occur particularly in the final check of the  
 30 attitude of the prawns ready for the shelling process, is that the prawns can assume incorrect attitudes which offer no possibility of distinction from the correct attitude by the known equipment.  
 35 There is thus a need to eliminate this defect.  
 According to the present invention there is provided transport and checking apparatus for prawns, the apparatus comprising conveying  
 40 means for conveying prawns in succession in a given direction, removal means arranged in the region of a downstream end of the conveying means for cyclic removal of prawns therefrom, checking means arranged in said  
 45 region for checking each prawn to identify prawns or foreign bodies to be ejected before such cyclic removal, and an ejector for ejecting such identified prawns or foreign bodies, the checking means comprising a feeler element, which is cyclically movable into the path  
 50 of the conveyed prawns to contact each prawn at a feeler edge of the element and which is pivotable about an axis substantially parallel to said direction, and sensing means responsive to the feeler element action.  
 55 In a preferred embodiment, the apparatus comprises feed equipment for the conveying and orienting of the prawns, timing equipment disposed in the end region of the feed equipment, a feeler device which is arranged in this  
 60 region and drivable cyclically into the conveying path of the prawns, with a carrier arm including a feeler element which comes into contact with the stock to be shelled and is  
 65 mounted to be pivotable about an axis sub-

stantially parallel to the conveying direction of the feed equipment, at least one sensor influenceable by the feeler element, and an ejector. The feeler element, at its outline coming  
 70 into contact with the prawns, has a feeler edge which preferably is arranged extending transversely to the conveying direction of the prawns.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying  
 75 drawings, in which:

Figure 1 is a schematic perspective view of apparatus embodying the invention;

80 Figure 2 is a cross-section of the apparatus, in the region of a feeler device thereof, showing a prawn in correct orientation;

Figure 2a is a plan view of the apparatus, with reference to Fig. 2, showing a feeler  
 85 edge of the feeler device;

Figure 3 is a view similar to Fig. 2, but showing a prawn in an incorrect orientation;

Figure 3a is a view to Fig. 2a, but with reference to Fig. 3;

90 Figure 4 is a view similar to Fig. 3, but showing a prawn in another incorrect orientation;

Figure 4a is a view similar to Fig. 3a, but with reference to Fig. 4;

95 Figure 5 is a view similar to Fig. 4, but showing a prawn in yet another incorrect orientation; and

Figure 5a is a view similar to Fig. 4a, but with reference to Fig. 5.

100 Referring now to the drawings, there is shown in Fig. 1 apparatus comprising feed equipment 1, of which only part is shown and which is divided into a feeding part 2 and a waiting part 3, the equipment being disposed  
 105 in a frame (not shown) of a machine for shelling of prawns. The feeding part 2 is acted on in suitable manner by a conveying oscillatory movement to convey prawns in the direction of the arrow at the right in Fig. 1. The waiting  
 110 portion 3, which adjoins and has a similar profile to the feeding part 2, is provided at its base with a gap 4 through which a cycling device 5 engages. The device 5 is moved by means of a suitable drive to cyclically seize  
 115 the prawns and guide them out of the waiting portion 3. The latter is provided with a lateral passage (not shown) opposite which stands an air nozzle 7 as an ejector. Disposed above the waiting portion 3 is a feeler device 8  
 120 which, driven in suitable manner, is moved perpendicularly to the feeding equipment 1 in synchronism with the equipment 5. In that case, a lowering of the device 8 takes place when the equipment 5 is at rest before the  
 125 start of a new advancing movement.

The feeler device 8 comprises a carrier arm 9 which, at its side facing the equipment 1, has a feeler element 10. The element is provided with a feeler edge 11 and is mounted  
 130 on the arm 9 to be pendulating about an axis

12 extending in longitudinal direction of the equipment 1. Arranged above the axis 12 is a sensor 13, which preferably is an inductive proximity switch, having its active zone 14 disposed in the pivot path of a switch tag 15 disposed at the feeler element 10. The switch tag 15 has a passage which, in the rest setting-held by springs (not shown)—of the feeler element 10 is disposed opposite the active zone 14 of the sensor 13.

In use, after passing suitable equipment for the singling and orienting, the prawns pass to the feeding part 2, shown in Fig. 1, of the feeding equipment 1, in which they are advanced by reason of the micro-throw effect resulting from the oscillatory movement of the same. The prawns thereby pass singly to the waiting portion 3, wherein the foremost prawn is held up in the range of action of the feeler device 8 by means of an abutment 17 (not shown in Fig. 1 for reasons of clarity). In this instant, the feeler device 8 lowers onto the prawn until the feeler edge 11 of the feeler element 10 comes into contact with the prawn. If the prawn is disposed in the correct attitude, appropriate for further processing, as illustrated in Figs. 2 and 2a, then the feeler element 10 retains its setting relative to the carrier arm 9 so that the sensor 13 remains uninfluenced. On subsequent release of the checked prawn through raising of the carrier arm 9, the abutment 17 is driven out and the prawn is fed, for the further processing, by means of the equipment 5 moved in correspondence with the arrows 16. When a foreign body, a prawn fragment or a prawn in incorrect orientation according to Figs. 3 to 5a arrives under the feeler device 8, then the feeler element 10 is deflected by reason of the eccentric support when it is set down on the prawn. This has the consequence that the switch tag 15 of the feeler element 10 pivots into the active zone 14 of the sensor 13 and thereby initiates a switch signal which, evaluated with time delay, effects loading of the air nozzle 7 of the ejector 6 with air. In that case, the time delay is so dimensioned that the air current comes into effect when the return stroke of the carrier arm 9 takes place. By means of the air current, the object recognised in this manner as faulty is removed out of the conveying path so that a further conveying thereof by the equipment 5 does not take place.

As is evident from the drawings, recognition of the incorrect orientation shown in Figs. 5 and 5a, which together with the incorrect orientation according to Figs. 4 and 4a occurs most frequently, takes place in similar manner.

## CLAIMS

1. Transport and checking apparatus for prawns, the apparatus comprising conveying means for conveying prawns in succession in a given direction, removal means arranged in

the region of a downstream end of the conveying means for cyclic removal of prawns therefrom, checking means arranged in said region for checking each prawn to identify prawns or foreign bodies to be ejected before such cyclic removal, and an ejector for ejecting such identified prawns or foreign bodies, the checking means comprising a feeler element, which is cyclically movable into the path of the conveyed prawns to contact each prawn at a feeler edge of the element and which is pivotable about an axis substantially parallel to said direction, and sensing means responsive to the feeler element action.

2. Apparatus as claimed in claim 1, wherein the feeler edge extends transversely to said direction.

3. Apparatus substantially as hereinbefore described with reference to the accompanying drawings.

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